Analox 4000 - Temperature Monitor

User Manual

Analox Sensor Technology Ltd
15 Ellerbeck Court, Stokesley Business Park
North Yorkshire, TS9 5PT

T: +44 (0)1642 711400 **F:** +44 (0)1642 713900
W: www.analox.net **E:** info@analox.net

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Packing Contents Checklist

A) Analox 4000 Temperature Monitor
B) Air Temperature Sensor (SA1S14CD46N001 or SA1S14CD46N002)
or
C) Water Temperature Sensor (SA1S14CD47N721 or SA1S14CD47N722)
D) IEC mains Lead
E) 2.1mm DC Jack Socket
F) 2 Way Screw Terminal Socket Block
G) Trimming Tool
H) User Manual
I) Test Certificate

Analox 4000 Specification

ELECTRICAL

Range:	0 to 100°C
Resolution:	HIGH 0.01°C LOW 0.1°C
Electronic Accuracy:	± 0.02% Full Scale
Power Supply: Options	85 to 264 VAC, 47 to 63 Hz Without switching. 12v to 32v DC Max Ripple 1v
Outputs: (If Fitted)	0 – 1 Volt for Chart recorder 4 – 20mA internally powered.
Alarm Relays: (If Fitted)	2 x Single pole changeover Rated 7 Amp 240v AC 30v DC Configurable to be energised or De-energised when in Non-Alarm Condition.

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Operating Instructions For Analox 4000

WARNING
These instructions should be read and understood by all individuals who will be responsible for operation of this analyser. The actions taken as a result of the measured levels must be in strict accordance with the Company and Government regulations.

INTRODUCTION
The Analox 4000 temperature monitor provides a continuous digital display of temperature measured by the Platinum Resistance Sensor. The instrument displays the measured value on a 4 ½ Digit red LED configured to read over the range 0 to 100°C.

The resolution of the display may be selected at any time, with a front Panel switch, which effectively suppresses the least significant digit without affecting the scaling of the instrument.

The sensors used by the instrument all incorporate highly accurate platinum resistance film detector elements and several physical options can be specified by the user, when ordering:

1. If RH% is also being measured in the same area as the temperature, then the two sensors may be combined in a single unit which transmits two separate 4 – 20mA signals to the two separate instruments i.e. an Analox 7000 and Analox 4000.

2. A watertight sensor assembly mounted in a ½ inch BSP Tapered thread elbow fitting, tested to 100-bar pressure suitable for direct inclusion in a hot water supply system.

3. A multi-purpose fast response probe, manufactured from seamless stainless steel and fitted with a 1/8 inch BSP compression fitting, movable over its entire length to allow flexibility in sitting the probe.

4. A flat PRT element only which may be bonded with a suitable adhesive to directly measure surface temperature.

All the above sensors communicate with the instrument via a 4-20mA signal loop. The 24 volt D.C. power for the loop is provided by the Analox 4000 instrument.

The instrument is easy to calibrate, using the 'ZERO' and 'CAL' adjustments on the front panel. User adjustable high and low audio/visual alarms, together with relays, are fitted as standard and these may be adjusted over the full range of the instrument. The relay outputs are available on the instrument rear panel.

Two power supply options are fitted on all instruments as standard.

Input 1 is a standard IEC 3-pin connector for AC power in the range 85 to 264 VAC, 47 to 63 Hz WITHOUT switching or selecting.

Input 2 is a standard co-axial battery charger type connector or a two way screw terminal type connector for low voltage power input in the following range.

DC 12v to 32v

NOTE: Polarity of connection of DC is important.

The internal power supply unit also incorporates a re-chargeable nickel cadmium battery, which provides up to 1 hour of normal operation in the event of external power failure. External power status and internal battery condition are indicated by an LED on the front panel.

CALIBRATION

The instrument and sensor assemblies are fully calibrated before they leave the factory and should not require frequent re-calibration.

The 4 – 20 mA sensor transmitter is supplied in two forms:

(a) With no external calibration facility.
(b) With two external, spring loaded switches which permit stimulation of 0°C and 62°C

The calibration procedure is slightly different depending on which sensor transmitter has been supplied.

1. Zero Adjustment:

Type (a) Remove the lid from the transmitter housing and locate the three wires coming from the sensor. NOTE THEIR POSITIONS and then disconnect them from the terminals '+' and '+S' together and then terminals '-' and '-S' together. Connect a precision 100-Ohm resistor (± 0.1%) between the '+S' and '-S' terminals. This stimulates the probe resistance at 0°C.

Using the trimming provided with the instrument or a small Instrument screwdriver, adjust the 'ZERO' control until the display reads 00.00. NOTE: The low alarm will trip during the Zero setting

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process. Remove the 100-Ohm resistor ONLY and carry out the span adjustment procedure, described on the next page.

Type (b) This operation may require two persons if the sensor and instrument are widely separated.

Depress and hold down the 'PRESS FOR 0°C' switch on the sensor transmitter. Using the trimming tool provided with the instrument or a small Instrument screwdriver, adjust the 'Zero' control until the display reads 00.00.

NOTE: The low alarm will trip during the Zero setting process. Release the 'PRESS FOR 0°C' switch and carry out the span adjustment procedure.

2. Span Adjustment:

Type (a)
Having carried out the Zero adjustment, connect a precision resistor of 124 Ohms (± 0.1%) between the '+S' and '-S' terminals. This stimulates the probe resistance at 62°C. Using the trimming tool provided with the instrument or a small Instrument screwdriver, adjust the 'CAL' control until the display reads 62.00. NOTE: The high alarm may trip during this operation depending on the current HI setpoint. Remove the 124 Ohm resistor and the connections between '+' and '+S', and '-'and '-S'. Re-connect the sensor leads to the transmitter terminals and refit the unit cover. This completes the calibration process.

Type (b)
This operation may require two persons if the sensor and instrument are widely separated. Depress and hold down the 'PRESS FOR 62°C' switch on the sensor transmitter. Using the trimming tool provided with the instrument or a small instrument screwdriver, adjust the 'CAL' control until the display reads 62.00. NOTE: The high alarm may trip during this process, depending on the current HI setpoint. Release the 'PRESS FOR 62°C' switch. This completes the calibration process.

ALARM OPERATION

If an alarm condition occurs, the internal audible buzzer will sound intermittently and the yellow 'HORN' LED will flash, thereby identifying which instrument is causing the alarm. The appropriate red 'HI' or 'LO' LED will indicate the alarm level. The audible alarm can then be silenced by pressing the 'MUTE' button; this action will also turn off the yellow 'HORN' LED. If the reading is still in alarm condition, the red 'HI' or 'LO' LED will continue to flash until the measured value returns within the normal band. The red LED will then turn off. If an alarm condition occurs and the measured value then returns to normal before the 'MUTE' button is pressed, then the audible and

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visual alarms ill continue to be active until the 'MUTE' button is pressed. This facility allows the operator to be aware of any alarm occurrence whilst the instrument was unattended.

The alarms have a built-in Hysteresis of approximately 0.25°C to overcome 'nuisance' triggering when measuring near the set points. This means that if a high alarm occurs with a set point of 35°C, then having been acknowledged by pressing the MUTE button, the alarm will not clear until the measured value drops below 34.75°C.

ALARM SETTING

Before any adjustments are made to the 'SET ALARM' controls, the operator should release the locks on the knobs. This is done by moving the small lever located at the edge of the control until the knob turns freely. After adjustment, the locks should be reset in order to prevent accidental movement.

The 'SET HI'/'SET LO' toggle switch is normally biased to its central position to read the measured value. The high alarm trip point is set by moving this switch upward and adjusting the 'SET HI ALARM' control knob until the desired High alarm trip level is displayed. The low alarm trip point is set by moving the switch downward and adjusting the 'SET LO ALARM' control knob until the desired level is displayed.

If the operator only requires to check the currently set alarm points this may be done by just pressing the 'SET HI'/'SET LO' switch to the appropriate position, and reading the levels on the LED display.

OPTIONAL BATTERY BACKUP

If the external power supply to the instrument fails, the power supply circuitry in the instrument will automatically change over to the internal battery. When the instrument is being driven by its internal battery, the green 'STANDBY' LED on the front panel, will be lit and will remain on until external power is restored. The internal battery will provide normal operation for approximately 1 hour. When the battery has been discharged to such a level that instrument operation below this level would not be reliable, then a trip circuit will turn off the complete instrument and indicate this state by flashing the green 'STANDBY' LED at approximately 1 second intervals.

INTERFERENCE

Whilst all reasonable precautions have been taken within the instrument circuitry and the case is RF screened, it is still possible, in common with other instruments, that very strong, local radio frequency fields could cause interference. This will show up as erratic readings on the LED display. Where possible, RF sources such as potable radio Transmitters or telephones should not be operated very close to the instrument.

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INSTALLATION

The 1000 Range of ANALOX Instruments are available in two forms:

1. Suitable for insertion in a 19 inch Rack frame, occupying ¼ of a standard 3U frame.

2. Suitable for direct mounting in an existing instrument panel.

   For details of dimensions, cut-outs and mounting centres refer to the specifications page of this handbook.

The frame mounting version should be inserted in a suitable rack and secured by the 4 corner screws and plastic bushes, supplied with the Instrument. Refer to connection details below.

When fitting the panel mounted version, the nut and retainer assemblies should be left attached to the instrument, as supplied and the whole assembly inserted into the panel, easing the retainers into the 10mm holes. Tightening the 4 screws will expand the retainers, locking them into the panel. If the instrument is subsequently removed from the panel, it is only necessary to remove the screws – the retainers should remain captive in the panel.

REAR PANEL CONNECTIONS

All inputs to and outputs from the instrument are connected via various sockets and terminals on the rear panel of the instrument. All connections are identified by labels on the rear panel but are repeated here for convenience.

POWER SUPPLY

Power for the instrument may be derived from 1 of 2 options: -

1. A.C. Power in the range 85 to 264 VAC, 47 to 63 Hz and connected via a standard IEC 3 pin plug/ socket. A suitable lead is supplied with the instrument.

   NOTE: that no voltage selection is required when using this input -–the instrument will operate from any voltage within the stated range. The fuse for this power input is mounted in the rear panel and is rated at 1 Amp ‘T’ type.

2. Low voltage DC in the range 12v to 32v with a ripple not exceeding 1 volt and connected via the battery charger type connector or the 2 way screw terminal type connector. THE LOW VOLTAGE DC SUPPLY SHOULD BE EXTERNALLY FUSED at a rating of 1 Amp using a ‘T’ type delay fuse. NOTE: that connection polarity is important when using the DC input.

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SIGNAL INPUTS AND OUTPUTS

All signal inputs and outputs are made to removable, screw terminal plugs. The main connector is located down the right side of the rear panel, when viewed from the rear.

Several signal input options are fitted to the instruments. In the case of the Temperature Monitor model 4000, the sensor transmitter should be connected to terminals 14 and 18. Pin 18 is the sensor transmitter excitation voltage and should be connected to the positive of the transmitter.

NOTE: Ensure that there is NO LINK between terminals 15 and 16 – this is only fitted when the instrument is used with a voltage input.

Other signal inputs are not used on the 4000 instrument. Two, Analog outputs, proportional to the measured input signal are available from the instrument. Pin 8 provides 0 – 1 Volt representing 0 – 100°C. Pin 9 provides a 4-20 mAmp current representing 0 – 100°C. Pin 7 is the common connection for both outputs. The Voltage output should NOT be connected to a load less than 10,000 Ohms. The current output is powered from an internal nominal 24 volt supply and can operate into a load from 50 Ohms to 500 Ohms.

OPTIONAL ALARM RELAYS

All instruments in the ANALOX 4000 Range are normally fitted with two relays, which can operate in conjunction with the HI and LO alarms. The relays have a single pole change over contact arrangements, rated to switch up to 7 amps @ 240v AC or 30v DC

The relays may be configured to be energised or de-energised, when the Instrument is in non-alarm state. If the relays are configured to be in a normally energised state, this will provide a ‘Fail-safe’ facility in that a total power failure will cause the relays to release and signal an alarm condition. However, the extra power drawn by the relays being energised for most of the time will reduce the time for which the instrument will operate on ‘Battery Back-up’. Contact arrangement is shown on the rear panel. Instruments normally leave the factory with the relays configured to ENERGISE IN ALARM conditions.

REPAIR AND SERVICE

Apart from periodic Sensor calibration, the Instrument has been designed to provide long, trouble free service. However in the vent of a fault condition arising, contact your local distributor or Analox Sensor Technology Ltd, whose address, telephone, telefax and email appear on the front page of this handbook.

The instrument contains complex, precision circuitry which requires special test equipment to ensure correct internal set-up and calibration. Internal repairs or adjustments by the user are therefore NOT recommended. A

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separate service manual may be purchased by approved service centres, from AST Ltd.

AST Ltd WILL NOT ACCEPT RESPONSIBILITY FOR ANY EVENTS OCCURING AS A RESULT OF UNAUTHORISED ADJUSTMENTS OR REPAIRS TO THE INSTRUMENT.

MECHANICAL SPECIFICATION

Dimensions

Rack mounted version	
Depth Overall:	245mm
Height Overall:	129mm
Width Overall:	107mm
(¼ 19” x 3U Rack)	
Weight:	2 Kg
Panel Mounted version	
Depth Overall:	245mm
Height Overall:	133mm
Width Overall:	120mm
Weight:	2 Kg
Panel Cut-out Aperture:	
Height:	112mm
Width:	102mm
Mounting Centres:	
Holes:	4 x 10mm
Height:	122.5mm
Width:	91.4mm
Centered on Cut-Out	

Environmental

Operating Temperature:	0 – 60°C
Storage Temperature:	–40 to +85°C
Relative Humidity:	95% at 40°C
Non. Condensing.	

DISPOSAL

According to WEEE regulation this electronic product can not be placed in household waste bins. Please check local regulations for information on the disposal of electronic products in your area.